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ASPECTS OF TREATMENT*

A study of colovesical fistulae in a district hospital

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Summary

A retrospective study of 32 patients with colovesical fistula was carried out. The most frequent presenting symptoms were urinary; an abdominal mass was found in 40% of patients. Urine culture grew bowel organisms in 93% of patients and the diagnosis was most accurately confirmed by barium enema which showed evidence of a fistula in 55% of patients examined. Surgical treatment varied from staged resection to primary resection and anastomosis, disconnection of the fistulous tract or colostomy alone. The results are compared and suggest a higher success rate with a multi-staged procedure. Different methods of diagnosis are discussed as well as possible causes for varying success rates among the surgical procedures.

Introduction

Colovesical fistula was first described by Wagner in 1685 and then studied collectively for the first time by Cripps in 1888 (*1*). The fistula is a serious surgical problem as it rarely closes spontaneously and may cause death from pyelonephritis and renal failure. Fistula is the indication for surgery in 2–4% of patients with diverticular disease (*2*) and the occurrence rate is 1 : 3000 acute hospital admissions (*3*). We have analysed the aetiology, presentation, investigations, and management from a review of 32 patients who were treated over a 30 year period between 1951 and 1981 at the Bradford Royal Infirmary.

Patients and methods

The clinical records of 32 patients who had been diagnosed as having a colovesical fistula were studied. The cases came from the records of two surgeons as the condition was not separately coded in the hospital records.

Results

AETIOLOGY

Our 32 patients comprised 21 males and 11 females. Diverticular disease was diagnosed as the aetiology of the fistula in 21 patients(60.6%). Carcinoma of the bowel occurred in 3 women and 5 men (24%). Two patients had inflammatory bowel disease; one of these developed carcinoma of the colon and is included in that group. One patient developed the fistula after a repair of a vesico-vaginal fistula and one case arose from carcinoma of bladder following radiotherapy.

AGE

The age distribution among those with diverticular disease ranged from 35 to 76 years, but the majority (65%) occurred in the sixth and seventh decades. The patients with carcinoma occurred from the fifth to eighth decades, while other aetiologies, Crohn's disease, congenital caecal diverticulum, and other forms of inflammatory bowel disease followed the age distribution of their own primary condition.

SEX RATIO

For diverticular disease the sex ratio is 14 men : 6 women. Of the 5 women in the series who had not had a hysterectomy prior to the development of a fistula 3 had diverticular disease and 2 had a carcinoma. For carcinoma the ratio is 6 men : 3 women

Clinical presentation

It was unusual for patients to present with symptoms of bowel disorder. Abdominal pain, especially left iliac fossa aching pain, was complained of by 18% of patients. Slight alteration in bowel habit, either increasing constipation (8 patients) or minor episodes of diarrhoea (3 patients) was complained of on direct questioning. More frequently the presenting symptoms were urinary. Dysuria, with recurrent urinary infections caused by bowel organisms, was the usual mode of presentation. Persisting or recurrent attacks of dysuria despite medical treatment were the main reasons for presentation. On direct questioning pneumaturia, usually at the end of the urinary stream, was a symptom in 59% of patients and faecaluria, the passage of recognisable faecal matter per urethra, was present in 28% of patients. Haematuria and pain due to epididymitis occurred but not frequently. On examination a palpable mass was present in the left iliac fossa in 40% of patients.

Symptoms were present from 3 months to 2 years but the majority presented within 6 months of commencement of symptoms.

Investigations

Radiology Barium enema examination was carried out to show the basic colonic pathology as well as to demonstrate evidence of fistula formation. Out of a total of 29 examinations 55% showed evidence of fistula formation. There was no higher rate of demonstration of the fistula in carcinoma than in diverticular disease. The abnormalities found were diverticular disease, carcinoma, and occasionally free gas or barium in the urinary bladder. Extravasation of barium from the colon at the site of the fistula was seen in some patients. While visual evidence of bladder and bowel communication obviously confirms the diagnosis, the presence of diverticular disease on X-ray, with a history of pneumaturia is also diagnostic.

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Cystography was only performed on 2 patients and a fistula was seen in 1, a patient with a congenital caecal diverticulum; the other patient had Crohn's disease.

Intravenous urography (IVU) was performed on 5 patients with diverticular disease and showed hydronephrosis in 2. Of the 8 patients with carcinoma, gas was seen in the urinary bladder of 2 and a filling defect in 3.

Sigmoidoscopy Sigmoidoscopy was carried out on 3 patients 2 of whom had carcinoma of the rectum and the other had a mass palpable on bimanual examination.

Cystoscopy Fifteen patients underwent cystoscopy and either the fistula or an abnormality suggestive of a fistula was seen in 13 cases. The 2 patients whose cystoscopy was normal had diverticular disease. Six patients whose fistula was due to diverticular disease were cystoscoped and an area of erythema was seen in 3 and the fistula was identified in a further 3. Five patients with carcinoma who were cystoscoped all showed invasion of the bladder and the actual fistula was seen in 3. The fistula when seen was usually situated in the dome of the bladder.

Midstream urine culture (MSU) Records of 24 patients were available. The 6 cases whose fistula was due to carcinoma all had infected urine. Of the 20 patients with diverticular disease 19 had infected urine; the exception was one who had been on antibiotic therapy. As might be expected bowel organisms were found in all infected urine, predominantly *E coli* and *Strep faecalis*.

Management

We have divided the patients, from the management point of view, into three groups. Those with diverticular disease, those with carcinoma, and those whose fistula was due to some other cause.

DIVERTICULAR DISEASE

In this group 20 patients underwent surgery as indicated by Table I. The most favoured procedure was a multi-staged resection of defunctioning colostomy followed by resection and anastomosis of diseased bowel and later closure of the colostomy, or with the first two stages combined. These procedures were carried out on 9 patients with seven good results, and at follow-up at 1 year there was no operative mortality. Of the 2 patients considered to have a poor result the fistula recurred in one and the other developed renal failure, which caused eventual death in 4 years.

Of the 4 patients treated by colostomy alone 2 died from renal failure. These cases were all treated in the 1950s when defunctioning colostomy alone was in vogue. Two patients were treated by disconnection of the fistula with a simple repair of the colonic defect using an omental patch, but 1 required a Hartmann's procedure for subsequent leakage.

TABLE I *Management of fistula resulting from diverticular disease*

Diverticular disease	*Total*	*Results*	
Three-stage repair	6	5	Good
		1	Renal failure
Two-stage repair	3	2	Good
		1	Urethral fistula
One-stage repair	4	2	Good
		1	Recurrent fistula
	1		Ureteric obstruction
Colostomy only	4	1	Good
		2	Died—renal failure
		1	Lost to follow-up
Omental patch	2	1	Good
		1	Leaked—Hartmann's procedure
Refused operation	1		Died

Single-stage resection and anastomosis was carried out in 4 patients with good results in 2. The two poor results being due to the recurrence of a fistula which led to septicaemia and death in 1 patient and ureteric obstruction in another.

The severity of the inflammation at the time of operation dictated the type of procedure performed. The more inflamed being treated by multi-staged resection

CARCINOMA

Of the 7 patients who had surgery 5 had a single-stage resection. There was a good result in 4 but 1 patient died postoperatively following an abdominoperineal resection. One patient had a three-staged procedure and has survived 7 years. Only 1 patient was considered inoperable on laparotomy and died shortly afterwards.

The procedure performed was bowel resection with its lymphatic drainage and partial cystectomy.

TABLE II *Management of fistula resulting from carcinoma and other causes*

Carcinoma	*Total*	*Survival*
One-stage resection	5	1 3 years
		2 2 years
		1 6 months
		1 Died postoperatively
Inoperable	1	
Three-stage resection	1	1 7 y. asymptomatic
Refused op.	1	Died

Others	*Total*	*Results*
Congenital caecal diverticulum	1	Right hemicolectomy, good result
Post repair vesico-vaginal fistula	1	Good result
Carcinoma bladder	1	Colostomy, died
Crohn's diseasae of colon	1	Three-stage resection recurrence of fistula, permanent colostomy

FISTULA DUE TO OTHER CAUSES

The patient with a fistula following repair of vesico-vaginal fistula did well with a one-stage resection as did the patient with the congenital caecal diverticulum. The patient with Crohn's disease of the large bowel developed a recurrent fistula following a three-stage resection and had a permanent colostomy performed. The last patient, who had developed his fistula following radiotherapy for advanced bladder cancer, had a colostomy alone performed and died shortly afterwards.

Discussion

Fistula formation comes after abscess and obstruction in the incidence of complications of diverticular disease (*4*). Obstruction while it may not be the cause of the fistula is usually involved in keeping it open.

Diverticular disease is again the most common cause of fistula formation in our group. The usual mode of presentation being with urinary symptoms. Heiskell (*5*) showed in animal experiments that colovesical fistula could be well tolerated as long as there was no distal urinary or bowel obstruction as this caused an increase in sepsis. The infrequency of urinary obstruction together with the difficulty of observation of micturition may help to explain the lower

recognised incidence among women. The traditional protection of the uterus being interposed between colon and bladder may not be the sole reason because the uterus is usually atrophic at the age of presentation and 5 of our patients had not had a previous hysterectomy. Two of these women had diverticular disease and 3 had carcinoma. Because the gas stays in the dome of the bladder and tends to be passed at the end of micturition rather than during it the sensation of its passage may also go unnoticed. Passage of gas becomes more obvious if the patient can micturate underwater. Other physical methods such as the ingestion of dye like methylene blue or charcoal have been used with some degree of success to demonstrate urinary contamination but the quantities entering the bladder are usually small (*6*).

Barium enema examinations in our series reflect the success rate of Morse (*6*) (30–50%) and Ray *et al* (*7*). It is a necessary examination in that not only may it show positive evidence of a fistula in up to 50% of cases but will indicate the aetiology of the condition. Intravenous urography has been recommended (*2*) in preoperative assessment because of the close proximity of the ureter to the fistula in some cases. Cystography has been disappointing in large bowel fistulas and this is said to be due to the higher colonic pressure giving rise to a unidirectional fistula; also the bladder opening can be very small in diverticulitis, while retrograde or micturating cystography may double the success rate (*8*). Small bowel and caecal pathology give a much higher degree of success in cystoscopy and cystography because of the lower pressures and the actual involvement of the bladder wall in the disease process (*9*).

Choice of surgical treatment depends on the method of presentation. Three distinct groups of patients with fistulas arising from diverticular disease have been described (*10*). Firstly, the group with chronic relapsing urinary tract infections as a result of a chronic fistula. Secondly, the patient with diverticulitis who, as an extension of a pericolic abscess, develops a colovesical fistula. Thirdly, a patient who without systemic illness suddenly develops symptoms of fistula due to perforation of an adherent solitary diverticulum of large bowel.

Proximal colostomy alone was advocated (*11*) but this has been found unsatisfactory and in our 4 patients we had a 50% mortality following colostomy. A debate has been taking place for some time as to whether definitive surgery should be by a single or multi-staged procedure. It is accepted that a single-staged resection should not be undertaken in the presence of severe infection, such as an abscess, when a third organ is involved or if the patient is in poor general health (*12*). Therefore a single staged procedure is indicated only in chronic fistulas or in the acute case after a prolonged course of antibiotics. Even so, and with the advent of more potent antibiotics, out of four cases who had a primary resection only two had a satisfactory result. Other authors have similarly disappointing figures. Farringer (*13*) in 10 cases of primary resection had two complications and 2 deaths and Steier (*14*) in 6 cases had 2 deaths. Treatment of the fistula by simple disconnection with bladder repair and omental patch was successful in 1 of 2 patients. The second patient developed leakage presumably due to continuous high colonic pressure proximal to a strictured area of inflammation. Patients with carcinoma tended to fare better with the single staged procedure and the poor survival rate is likely to be the result of the advanced state of their malignancy rather than to the fistula.

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